Complete the following on a separate sheet of paper:

p. 605 #19 (b) and (c) Check conditions!

(19)

Ho: $\mu_d = 0$ 2 pts μ_d = After - Before 1 pt

Ha: $\mu_d > 0$

Conditions:

1) Paired data	1) the test was done on the same subjects, before & after the exercise break was instituted	
2) SRS	2) stated random	4 pts
3) pop of diff. $\geq 10n_d$	3) there are more than 100 employees	
4) normal pop of diff. or $n_d \geq 30$	4) norm. prob. plot of differences is approx. linear --> normal data	

Conditions met --> t-distribution --> 1-sample Paired t-Test

2 pts

$$t = \frac{8.5 - 0}{\frac{7.472}{\sqrt{10}}} = 3.597$$ 3 pts

df = 9 1 pt

$P(t > 3.597) = 0.00289$ 3 pts

We reject Ho b/c p-value of $0.00289 < \alpha = 0.05$ 4 pts

We have sufficient evidence that the average difference between job satisfaction before and after the exercise break was implemented is greater than 0 and the exercise break helped improve job satisfaction.

(c) Type I error 1 pt

TOTAL: 21 pts

HW: p. 612 #8, 23

HW p. 612

(8)

μ_d = males - females

Conditions:

1) Paired data	1) the males and females are from the same country
2) SRS	2) assumed representative
3) pop $\geq 10n_d$	3) there are more than 270 countries in the world???
4) normal pop or $n_d \geq 30$	4) normal probability plot is linear => normal data

Conditions not quite met -> proceed anyway w/ t-distrib. -> Paired 1-sample t-Interval

$7.963 \pm (2.056)(8.796/\sqrt{27}) = (4.4839, 11.442)$

df= 26

We are 95% confident that the true average difference in the rate of male and female drunk 15-year-olds is between 4.4839% and 11.442%.

We are 95% confident that males have been drunk on average between 4.4839% and 11.442% more than females.

(23) μ_d = After - Before

Ho: $\mu_d = 0$ Ha: $\mu_d < 0$

Conditions:

1) Paired data	1) the test was done on the same rooms in the hotel, before & after the new AC units were installed
2) SRS	2) assume representative
3) pop of diff. $\geq 10n_d$	3) there are more than 80 rooms
4) normal pop of diff. or $n_d \geq 30$	4) norm. prob. plot of differences is approx. linear --> normal data

Conditions met --> t-distribution --> 1-sample Paired t-Int/test

$-1.6125 \pm (2.365)(1.238/\sqrt{8}) = (-2.648, -0.5775)$

df = 7

We are 95% confident that the average difference in the bacteria count in the hotel before and after the new AC units is between -2.648 and -0.5775 colonies/cubic ft.

We are 95% confident that on average the bacteria count is between 2.648 and 0.5775 colonies/cubic ft lower with the new AC units.

Since 0 is not in the interval, we have sufficient evidence that the new AC units did succeed in lowering the bacterial count.

Ho: $\mu_d = 0$ Ha: $\mu_d < 0$

$$t = \frac{-1.6125 -- 0}{\frac{1.238}{\sqrt{8}}} = -3.684$$

P(t < -3.684| df = 7) = 0.0039

We reject Ho b/c p-value of 0.0039 < alpha = 0.05.

We have sufficient evidence that the true average difference between the bacteria count before and after the new AC units is less than 0 colonies/cubic foot. Therefore we have evidence that the new AC units did reduce the bacteria in the air.